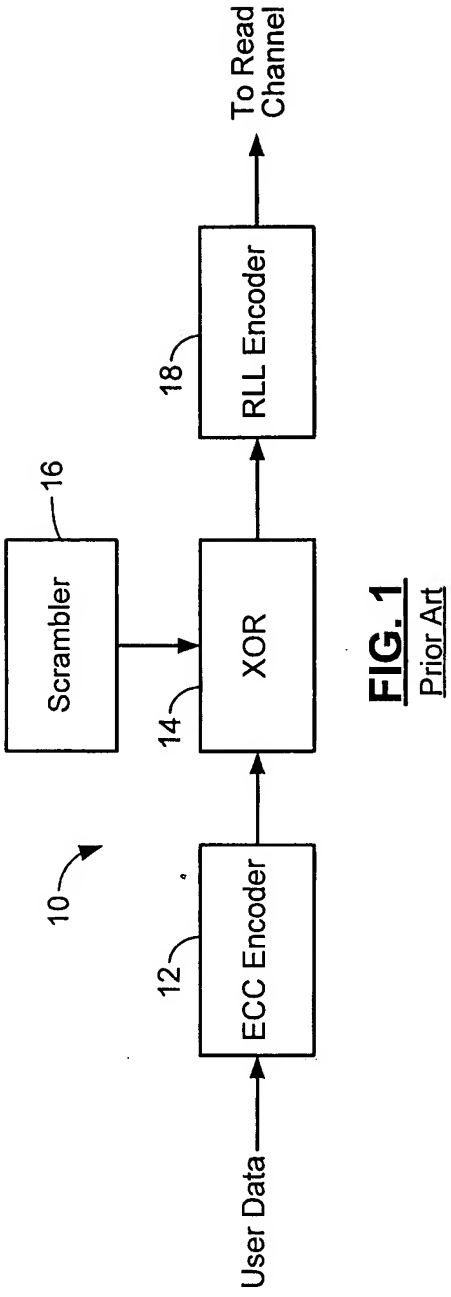

FIG. 1
Prior Art

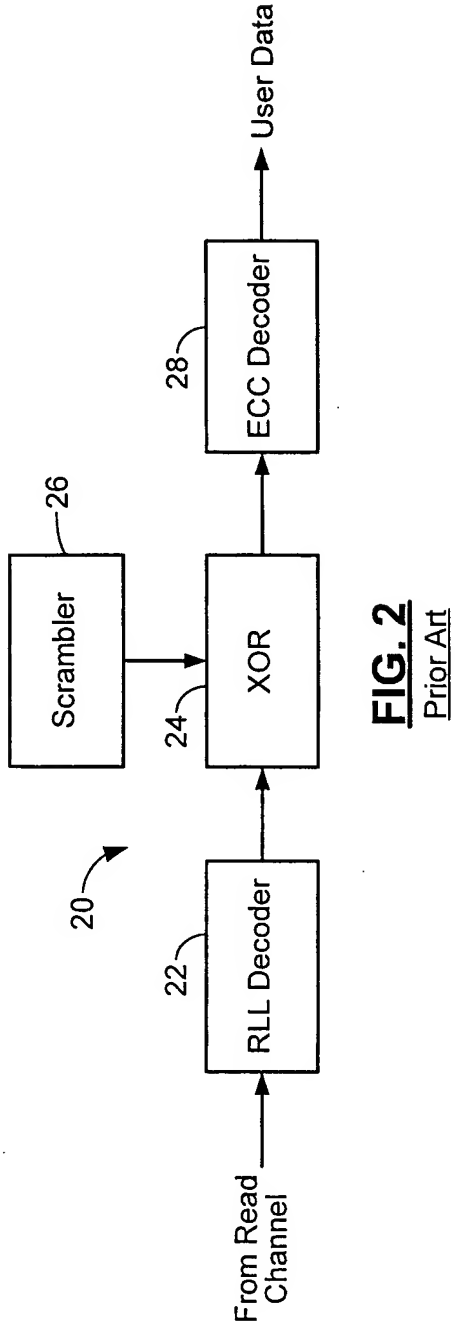

FIG. 2
Prior Art

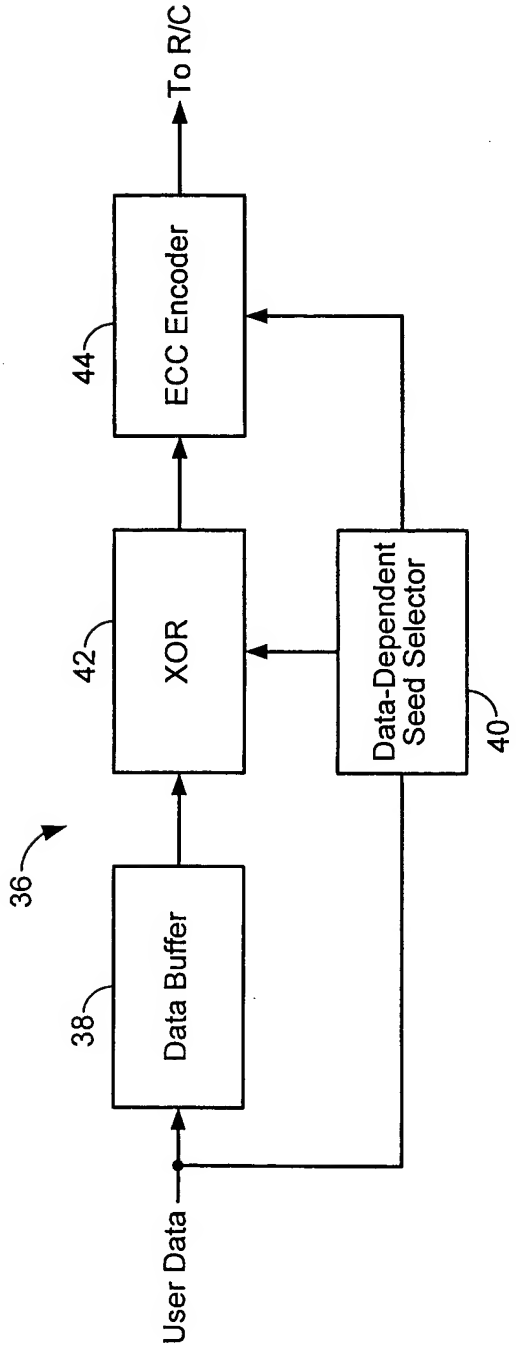
User Data
36
38
Data Buffer
42
XOR
40
Data-Dependent Seed Selector
44
ECC Encoder
To R/C

FIG. 3

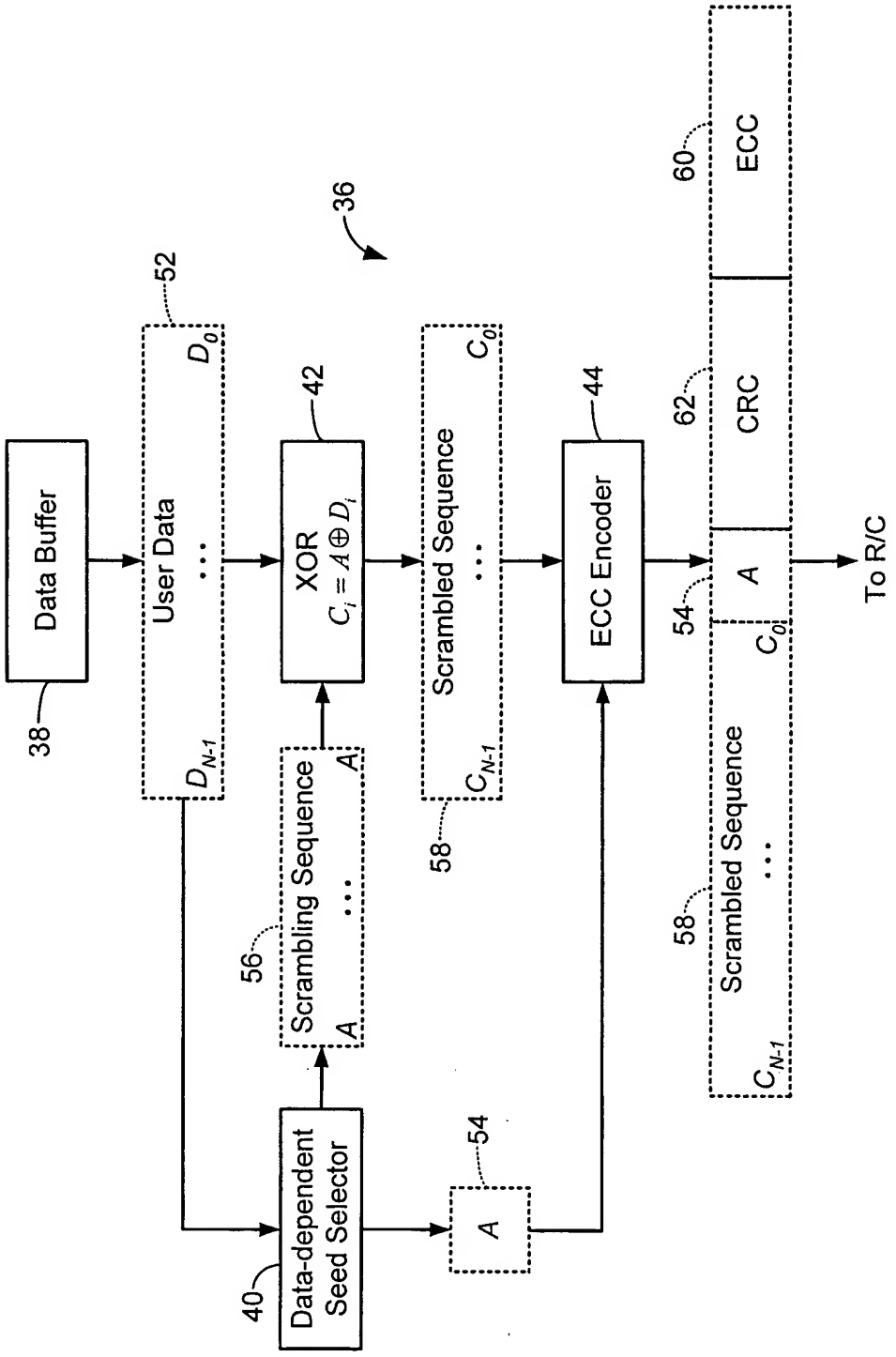
Data Buffer
38
User Data
D_0
D_{N-1}
52
36
XOR
$C_i = A \oplus D_i$
42
Scrambled Sequence
C_0
C_{N-1}
58
ECC Encoder
44
ECC
60
CRC
62
A
54
C_0
Scrambled Sequence
C_{N-1}
58
To R/C
Scrambling Sequence
A
56
Data-dependent Seed Selector
40
A
54

FIG. 4

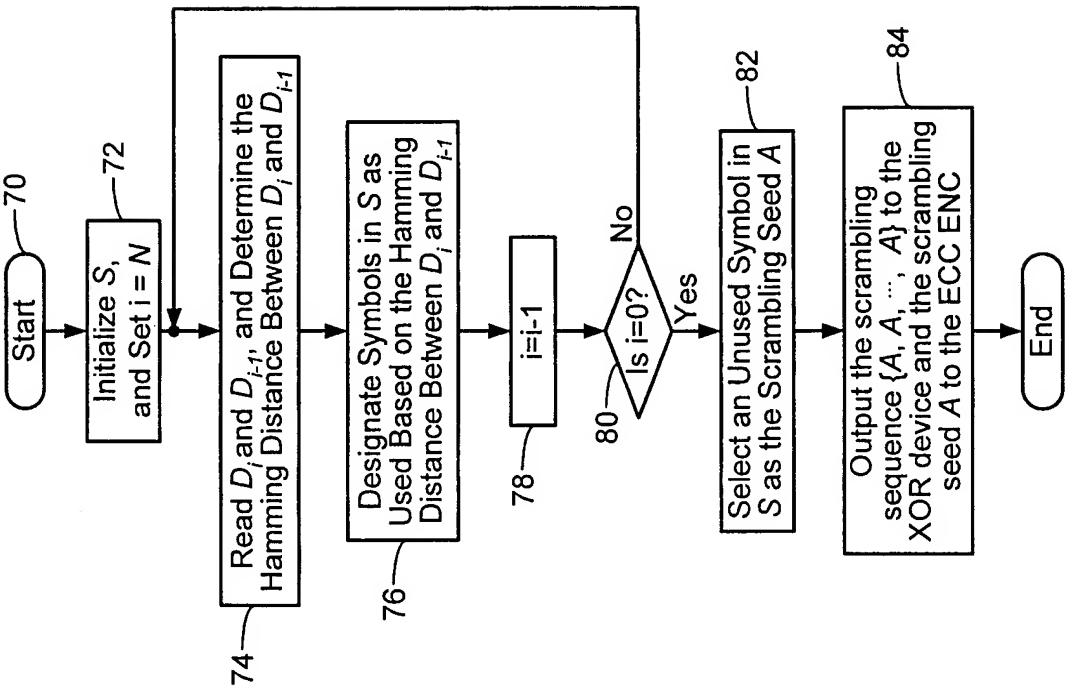
Start
70
Initialize S, and Set i = N
72
Read D_i and D_{i-1}, and Determine the Hamming Distance Between D_i and D_{i-1}
74
Designate Symbols in S as Used Based on the Hamming Distance Between D_i and D_{i-1}
76
i=i-1
78
Is i=0?
80
No
Yes
Select an Unused Symbol in S as the Scrambling Seed A
82
Output the scrambling sequence {A, A, ..., A} to the XOR device and the scrambling seed A to the ECC ENC
84
End

FIG. 5

Relationship	Symbols Designated as Used	Amount	Min. Hamming Distance	Min. Hamming Weight	Max. Sequence Size
$d(D_i, D_{i-1}) \geq 3$	D_i, D_{i-1}	2	{1,2} or {2,1}	15.0%	255
$d(D_i, D_{i-1}) = 2$	D_i, D_{i-1}, X, Y (where $d(X, D_i) = d(X, D_{i-1}) = 1$ and $d(Y, D_i) = d(Y, D_{i-1}) = 1$)	4	{1,3} or {3,1}	20.0%	
$d(D_i, D_{i-1}) = 1$	D_i, D_{i-1}	2	{1,2} or {2,1}	15.0%	
$D_i = D_{i-1}$	D_i, D_{i-2}, Z (where $d(Z, D_i) = 1$)	12	{2,2,1}	16.67%	

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FIG. 6A

Relationship	Symbols Designated as Used	Amount	Min. Hamming Distance	Min. Hamming Weight	Max. Sequence Size
$d(D_i, D_{i-1}) \geq 3$	D_i, D_{i-1}	2	{1,2} or {2,1}	15.0%	312
$d(D_i, D_{i-1}) = 2$	D_i, D_{i-1}, X, Y (where $d(X, D_i) = d(X, D_{i-1}) = 1$ and $d(Y, D_i) = d(Y, D_{i-1}) = 1$)	4	{1,3} or {3,1}	20.0%	
$d(D_i, D_{i-1}) = 1$	D_i, D_{i-1}	2	{1,2} or {2,1}	15.0%	
$D_i = D_{i-1}$	D_i, D_{i-2}, D_{i-3}, Z (where $d(Z, D_i) = 1$)	13	{2,2,1,1}	15.0%	

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FIG. 6B

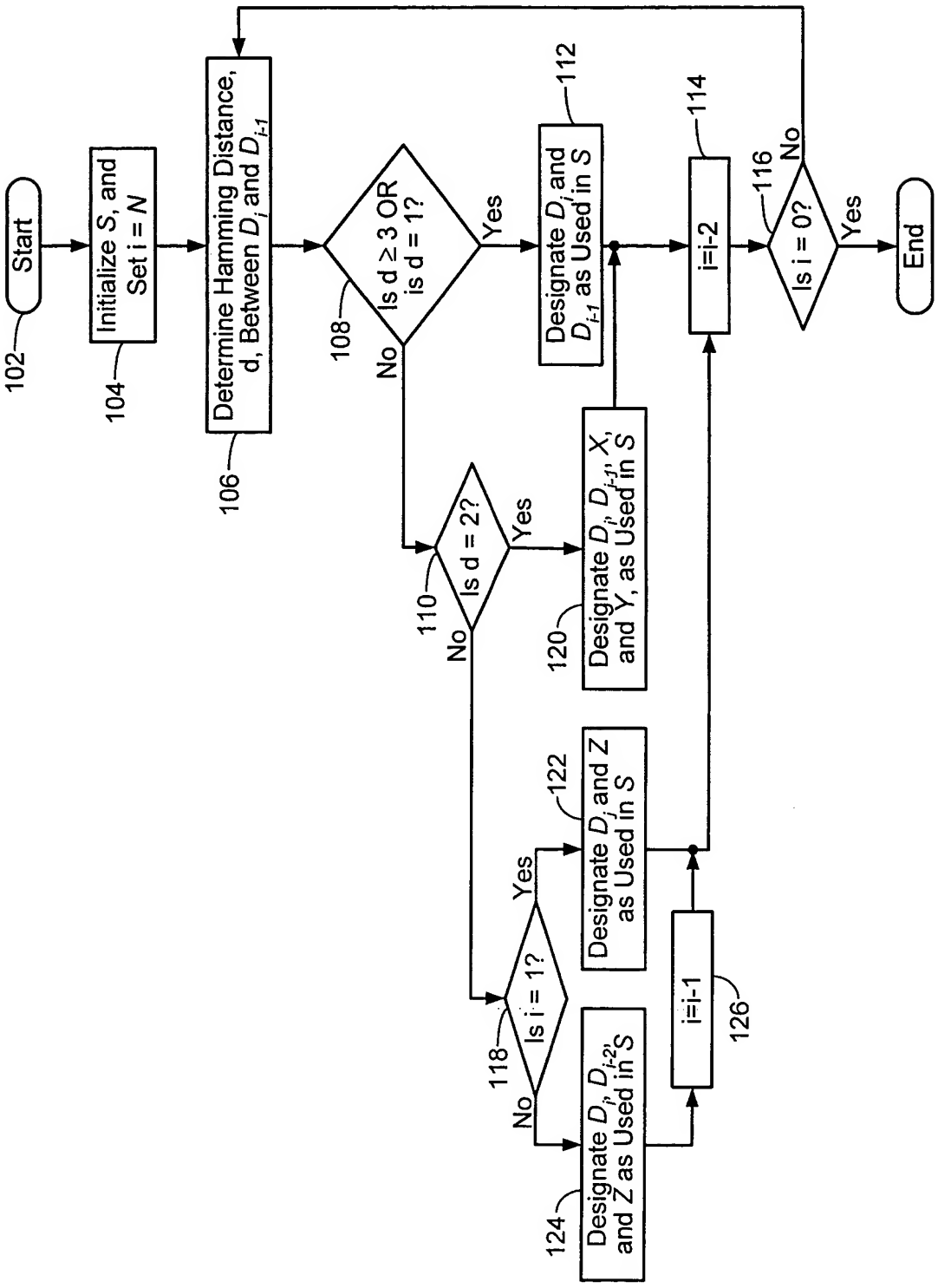
Start
102
Initialize S, and Set i = N
104
Determine Hamming Distance, d, Between D_i and D_{i-1}
106
Is d ≥ 3 OR is d = 1?
108
Yes
No
Designate D_i and D_{i-1} as Used in S
112
i=i-2
114
Is i = 0?
116
No
Yes
End
Is d = 2?
110
Yes
No
Designate D_i, D_{i-1}, X, and Y, as Used in S
120
Is i = 1?
118
Yes
No
Designate D_i and Z as Used in S
122
Designate D_i, D_{i-2}, and Z as Used in S
124
i=i-1
126

FIG. 7A

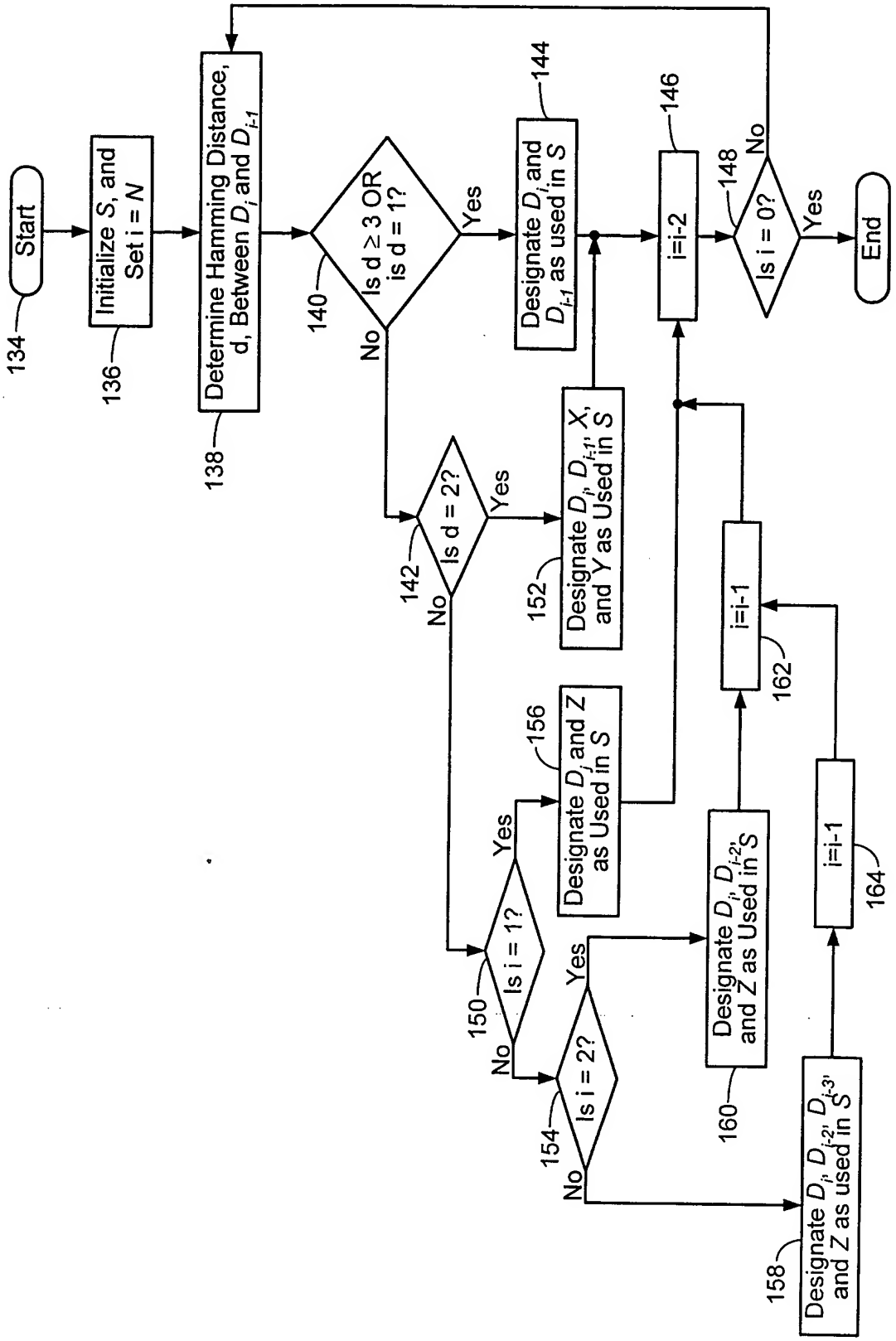
Start
134
Initialize S, and Set i = N
136
Determine Hamming Distance, d, Between D_i and D_{i-1}
138
Is d ≥ 3 OR is d = 1?
140
Yes
No
Designate D_i and D_{i-1} as used in S
144
i=i-2
146
Is i = 0?
148
No
Yes
End
Is d = 2?
142
Yes
No
Designate D_i, D_{i-1}, X, and Y as Used in S
152
i=i-1
162
Designate D_i and Z as Used in S
156
Is i = 1?
150
Yes
No
Designate D_i, D_{i-2}, and Z as Used in S
160
i=i-1
164
Is i = 2?
154
Yes
No
Designate D_i, D_{i-2}, D_{i-3}, and Z as used in S
158

FIG. 7B

Relationship	Symbols Designated as Used	Amount	Min. Hamming Distance	Min. Hamming Weight	Max. Sequence Size
$d(D_i, D_{i-1}) \geq 3$	$D_i, \overline{D_i}, D_{i-1}, \overline{D_{i-1}}$	4	{1,2} or {2,1}	15.0%	219
$d(D_i, D_{i-1}) = 2$	$D_i, \overline{D_i}, D_{i-1}, \overline{D_{i-1}}, X, Y$ (where $d(X, D_i) = d(X, D_{i-1}) = 1$ and $d(Y, D_i) = d(Y, D_{i-1}) = 1$)	6	{1,3} or {3,1}	20.0%	
$d(D_i, D_{i-1}) = 1$	$D_i, \overline{D_i}, D_{i-1}, \overline{D_{i-1}}$	4	{1,2} or {2,1}	15.0%	
$D_i = D_{i-1}$	$D_i, \overline{D_i}, D_{i-2}, \overline{D_{i-2}}, Z$ (where $d(Z, D_i) = 1$)	14	{2,2,1}	16.67%	

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FIG. 8A

Relationship	Symbols Designated as Used	Amount	Min. Hamming Distance	Min. Hamming Weight	Max. Sequence Size
$d(D_i, D_{i-1}) \geq 3$	$D_i, \overline{D_i}, D_{i-1}, \overline{D_{i-1}}$	4	{1,2} or {2,1}	15.0%	256
$d(D_i, D_{i-1}) = 2$	$D_i, \overline{D_i}, D_{i-1}, \overline{D_{i-1}}, X, Y$ (where $d(X, D_i) = d(X, D_{i-1}) = 1$ and $d(Y, D_i) = d(Y, D_{i-1}) = 1$)	6	{1,3} or {3,1}	20.0%	
$d(D_i, D_{i-1}) = 1$	$D_i, \overline{D_i}, D_{i-1}, \overline{D_{i-1}}$	4	{1,2} or {2,1}	15.0%	
$D_i = D_{i-1}$	$D_i, \overline{D_i}, D_{i-2}, \overline{D_{i-2}}, D_{i-3}, \overline{D_{i-3}}, Z$ (where $d(Z, D_i) = 1$)	16	{2,2,1,1}	15.0%	

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FIG. 8B

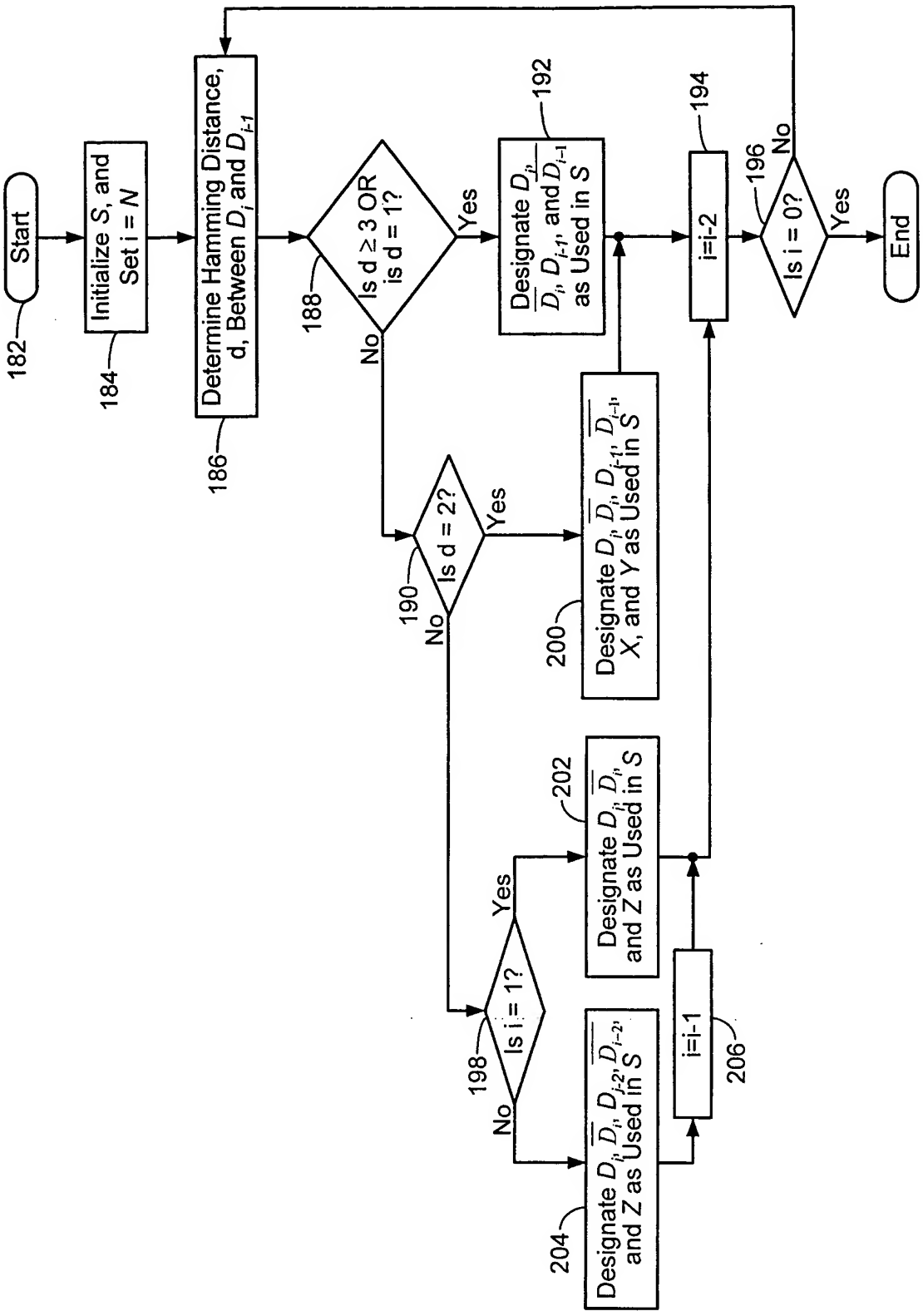
Start
182
Initialize S, and Set i = N
184
Determine Hamming Distance, d, Between D_i and D_{i-1}
186
Is d ≥ 3 OR is d = 1?
188
Yes
No
Designate D_i, $\overline{D_i}$, D_{i-1}, and $\overline{D_{i-1}}$ as Used in S
192
i=i-2
194
Is i = 0?
196
No
Yes
End
Is d = 2?
190
Yes
No
Designate D_i, $\overline{D_i}$, D_{i-1}, $\overline{D_{i-1}}$, X, and Y as Used in S
200
Is i = 1?
198
Yes
No
Designate D_i, $\overline{D_i}$, and Z as Used in S
202
Designate D_i, $\overline{D_i}$, D_{i-2}, $\overline{D_{i-2}}$, and Z as Used in S
204
i=i-1
206

FIG. 9A

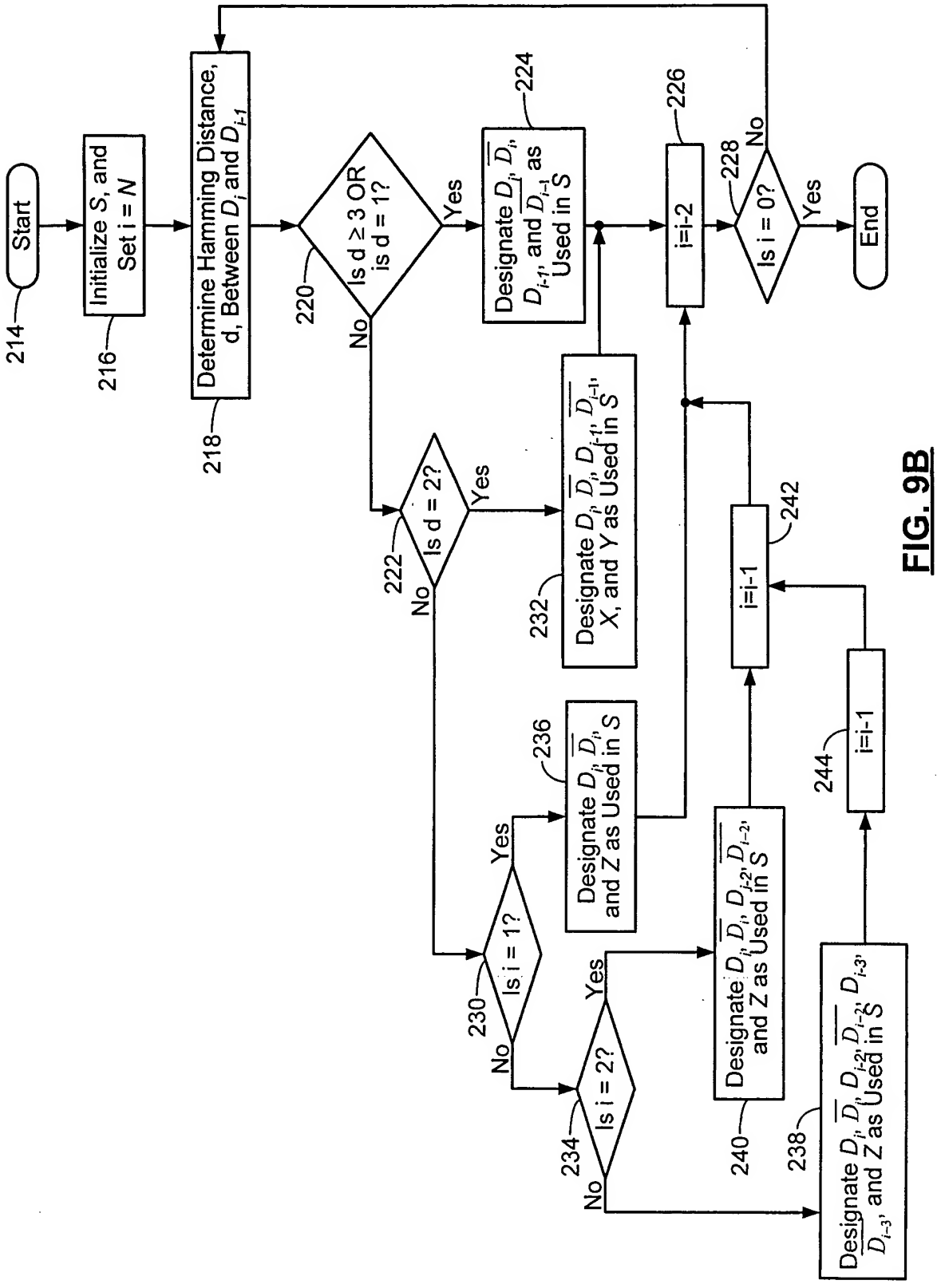
Start
214
Initialize S, and Set i = N
216
Determine Hamming Distance, d, Between D_i and D_{i-1}
218
Is d ≥ 3 OR is d = 1?
220
Yes
No
Designate D_i, $\overline{D_i}$, D_{i-1}, and $\overline{D_{i-1}}$ as Used in S
224
i=i-2
226
Is i = 0?
228
No
Yes
End
Is d = 2?
222
Yes
No
Designate D_i, $\overline{D_i}$, D_{i-1}, $\overline{D_{i-1}}$, X, and Y as Used in S
232
i=i-1
242
Is i = 1?
230
Yes
No
Designate D_i, $\overline{D_i}$, and Z as Used in S
236
Is i = 2?
234
Yes
No
Designate D_i, $\overline{D_i}$, D_{i-2}, $\overline{D_{i-2}}$, and Z as Used in S
240
i=i-1
244
Designate D_i, $\overline{D_i}$, D_{i-2}, $\overline{D_{i-2}}$, D_{i-3}, $\overline{D_{i-3}}$, and Z as Used in S
238

FIG. 9B